ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2 Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communications Systems - Engineering Development

COST (*In Thousands*)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
Total Program Element (PE) Cost	14352	16280	23987	23842	22239	24648	28139	25734	Continuing	Continuing
D097 C3I Interoperability Network Activity	5122	4264	3140	3171	3093	3231	3266	3282	Continuing	Continuing
D098 Tactical Radio Accessories	475	466	0	0	0	0	0	0	0	4662
D485 C4I Systems Certification	5498	5066	5303	4704	4494	4373	4444	4459	Continuing	Continuing
D589 Army Systems Engineering & Warfighter Technical Support	3257	6484	7755	7897	8172	8133	8148	8183	Continuing	Continuing
D591 Weapons System Technical Architecture	0	0	1063	1058	1054	1051	0	0	Continuing	Continuing
D615 JTRS Ground Domain	0	0	4904	5183	3581	6001	12281	9810	0	41760
D629 Tactical Communications System-Advanced Development	0	0	1822	1829	1845	1859	0	0	0	0

A. Mission Description and Budget Item Justification: This PE supports efforts to develop interoperability of Army programs and products, horizontally and vertically for the digitized battlefield. Project D097 supports development of the C4I Interoperability Network. Also included is the Army portion of engineering development efforts is support of the Combat Survivor Evader Locator System (CSEL)in Project D098. This includes follow-on programs to demonstrated technologies evolving from Wireless Network Access, Communications Network Planning and Management and initiatives to establish a Multiband Radio Integrated testbed. Project D485 supports C4I Systems Certification. It evaluates system's interoperability for the Army XXI battlefield digitization effort, in support of the Vice Chief of Staff of the Army (VCSA) and Army Acquisition Executive (AAE), to identify interoperability issues, develop certification recommendations, and provide architecture assessments by the Digital Integration Lab (DIL). Project D589 Army Systems Engineering & Warfighter Technical Support efforts is recommended by the Army Science Board and directed by the Army Acquisition Executive (AAE) and Vice Chief of Staff of the Army (VCSA). The ASE provides essential technology expertise on all Systems Engineering and Technical Architecture (SE/TA) matters critical to gain Information Dominance and foster interoperability among all Army systems. The Weapons Systems Technical Architecture, Project D591, supports development of the Joint Technical Architecture-Army (JTA-A) which provides the 'building code" foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. The Near -Term Digital Radio System (NTDRS) is funded in D615 in FY 2000 and in PE 0603713A/D370. The Army Unique development effort for the Joint Tactical Radio System (JTRS) is funded in D615 in FY 2001-2005.

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BUDGET ACTIVITY **5 - Engineering and Manufacturing Development**	PE NUMBER AND TITLE **0604805A Command, Control, Communications Systems - Engineering Development**

NTDRS program is a Research and Development (R&D) Program that maximizes the use of Non-Developmental Item (NDI), Commercial and Off-The-Shelf (COTS) hardware and software. The program provides an interim solution to the long term Army need for a greatly enhanced data radio capability. NTDRS will provide Tactical Operation Center (TOC) to Tactical Operation Center (TOC) data distribution from Battalion to Brigade and for critical moving platforms from Brigade to Division in the First Digitized Division and the First Digitized Corps. The Joint Tactical Radio System (JTRS) is a Research and Development program to procure radio systems to satisfy all service requirements. Since the singular functionality of current systems requires a commensurate number of unique discrete radio systems that must each have a costly logistics infrastructure, a consolidated systems approach to provide substantial benefits in the overall space, weight, power and cost is mandated. Therefore, the need is for a software programmable and hardware configurable digital radio system that provides increased interoperability, flexibility and adaptability to support the varied mission requirements of the warfighters. The system will be capable of simultaneous networked voice, video, and data operations with low probability of intercept over multiple frequency bands. The concept behind JTR is essential to realizing the goal of a fully digitized battlespace. JTR lays the foundation for achieving network connectivity across the RF spectrum. The JTR will provide the operational forces with an upgraded communications capability, for more effective battlespace management and interoperability among Command, Control, Communications, Computers and Intelligence (C4I) Systems. Project D629, Tactical Communications System – Demonstration Validation, provides for insertion of selected proven communications technology from program elements 0602782A, Project AH92 applied research and 0603006A, advanced technology development, into the next phase of development. Examples of these potential programs are the Joint Tactical Radio, high power solid state amplifiers and couplers, and packet appliqués used to increase network efficiency. Note: This is not a new start effort, previously this effort was funded under PE/Proj. 0603805A/D246.

B. Program Change Summary	FY 1998	FY 1999	FY 2000	FY 2001
Previous President's Budget (FY 1999 PB)	10710	16404	17616	17119
Appropriated Value	11052	16404		
Adjustments to Appropriated Value				
a. Congressional General Reductions	-342	-124		
b. SBIR / STTR	-268			
c. Omnibus or Other Above Threshold Reductions	-89			
d. Below Threshold Reprogramming	+3999			
e. Rescissions				
Adjustments to Budget Years Since FY 1999 PB			+6371	+6723
Current Budget Submit (FY 2000 / 2001 PB)	14352	16280	23987	23842

Change Summary Explanation: Funding - FY 1998 (+3999) reprogrammed to address high priority requirements for the Army Enterprise Architecture. FY2000/2001 funds increased to support critical Army Unique Joint Tactical Radio developmental efforts.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY **5 - Engineering and Manufacturing Development**	PE NUMBER AND TITLE **0604805A Command, Control, Communications Systems - Engineering Development**
	PROJECT **D097**

COST (*In Thousands*)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D097 C3I Interoperability Network Activity	5122	4264	3140	3171	3093	3231	3266	3282	Continuing	Continuing

A. <u>Mission Description and Budget Item Justification</u>: Project D097 - C3I Interoperability Network: Support warfighter systems' interoperability with a virtual command, control, communications, computer, intelligence, electronic warfare and sensor (C4IEWS) Digital Integration Lab (DIL) to help integrate the Army's programs and products, horizontally and vertically for the digitized battlefield, by replicating current and future tactical battlefield environments and enabling/facilitating comprehensive evaluations of new prototypes, evolutionary system developments, new technologies, commercial products, software and systems interoperability. Develop and operate the communications Army Interoperability Network (AIN) to electronically interconnect remote C4IEWS systems, labs/testbeds, field/integration sites, developers facilities and Battle Labs. Develop and apply protocol test tools to assure the capability to support and assess interoperability and compliance with the Joint/Army Technical Architecture's Variable Message Format (VMF) and MIL-STD-188-220 protocol standards suites.

FY 1998 Accomplishments:

- 710 Developed and operated the AIN core capabilities to facilitate 7500 test-days test support, experimentation and evaluation of Army C4IEW systems interoperability/software development/sustainment (for DAWE, FDD, ACTDs, Joint tests & fielded tactical systems)
- 490 Systems engineering of AIN design, analysis, integration, installation and test support for C4IEWS system requirements
- 618 Provided AIN's core network communications support to link geographically dispersed network hubs/sites
- 160 Provided technology improvements and system upgrades to meet emerging test support requirements for FDD, Force XXI & Y2K
- 450 Provided external DIL connectivity to remote battlefield digitization sites for digitization experimentation and tests
- 640 Upgraded, operated and supported DIL Evaluation & Certification Testbed and other facilities supporting experimentations/certifications needed for the battlefield digitization associated with 1st Digitized Division (FDD)
- 290 Acquired/updated DIL hardware and software interfacing systems, test tools, and supporting systems for FDD and TA/SA evaluations
- 120 Acquired DIL automated scenario drivers and test analysis tools for 1st Digitized Division evaluations and TA/SA evaluations
- 281 Developed VMF test tool, Rel 3 & 4, to support correct C4IEWS system implementations of the Technical Architecture's VMF standard
- 103 Developed PTT Conformance Tester V1 to support correct C4IEWS system implementations of Technical Architecture's Mil-Std-188-220
- 135 Developed PTT Monitor/Decoder V2 to support C4IEWS system development and experimentation with Technical Architecture's Mil-Std-188-220
- 1125 Performed Weapons Domain Analysis, Commercial Standards Evaluation/Development, and Embedded Battle Command (EBC)Analysis Activities in support of development of Weapon System Technical Architecture
  - Completed Map Data Loading Symbology Survey
  - Completed Imagery and Symbology Survey

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D097

Total 5122

FY 1999 Planned Program:

- 700 Develop and operate the AIN core capabilities to facilitate test, experimentation and evaluation of Army C4IEW systems interoperability/software development/sustainment (for Force XXI modernization, ACTDs, Joint tests and tactical systems)
- 390 Systems engineering of AIN design, analysis, integration, installation and test support for C4IEWS system requirements
- 589 Provide AIN's core network communications support to link geographically dispersed network hubs/sites
- 350 Provide external DIL connectivity to remote battlefield digitization sites for digitization experimentation and tests.
- 715 Upgrade, operate and support DIL Evaluation & Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army FDD, Y2K, Joint as well as STO/ACTD/ATD experimentation and evaluations.
- 200 Acquire/update DIL hardware and software interfacing systems, test tools, and supporting systems for 1st Digitized Division and TA/SA evaluations
- 375 Acquire DIL automated scenario drivers and test analysis tools for FDD evaluations and TA/SA evaluations.
- 200 Develop PTT Monitor/Decoder V2.1 to support Technical Architecture's Mil-Std-188-220B Sync Mode
- 150 Develop PTT Conformance Tester V2 to support correct C4IEWS system implementations of Technical Architecture's Mil-Std-188-220B
- 100 Develop PTT Network Analyzer V1 (partial capability) to support Mil-Std-188-220B CNR network operation & performance analysis in FDD
- 190 Develop VMF test tool, Rel 5, to support correct C4IEWS system implementations of Technical Architecture's VMF Reissue 3
- 70 Develop VMF Reissue 3 VMF database
- 140 Develop VTT VMF message generation scripting
- 95 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs

Total 4264

FY 2000 Planned Program:

- 440 Sustain AIN's core network connectivity
- 460 Provide external DIL connectivity to remote battlefield digitization sites for digitization experimentation and tests.
- 840 Upgrade, operate and support DIL Evaluation & Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army FDD, Y2K, Joint (e.g. Joint Contingency Force AWE) as well as STO/ACTD/ATD experimentation and evaluations.
- 375 Acquire/update DIL hardware and software interfacing systems, test tools, and supporting systems for 1st Digitized Division and TA/SA evaluations
- 150 Acquire DIL automated scenario drivers and test analysis tools for FDD evaluations and TA/SA evaluations.
- 100 Develop PTT Monitor/Decoder V2.2 to support Technical Architecture's Mil-Std-188-220B remaining features
- 125 Develop PTT Conformance Tester V2.1 to add full generation capability
- 250 Develop PTT Network Analyzer V2 (full capability) for Mil-Std-188-220B CNR network operation & performance
- 200 Develop VMF test tool, Rel 6, to support correct C4IEWS system implementations of Technical Architecture's VMF Reissue 4+

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D097

- 200 Develop VMF Reissue 4+ VMF database

Total 3140

FY 2001 Planned Program:

- 471 Sustain AIN's core network connectivity
- 450 Provide external DIL connectivity to remote battlefield digitization sites for digitization experimentation, and tests.
- 850 Upgrade, operate and support DIL Evaluation & Certification Testbed and other facilities supporting experiments/certifications needed for battlefield digitization for Army Corps digitization efforts, Joint, Allied as well as STO/ACTD/ATD experimentation and evaluations.
- 300 Acquire/update DIL hardware and software interfacing systems, test tools, and supporting systems for 1st Digitized Division and TA/SA evaluations
- 150 Acquire DIL automated scenario drivers and test analysis tools for FDD evaluations and TA/SA evaluations.
- 200 Develop PTT Monitor/Decoder V3 to support Technical Architecture's Mil-Std-188-220C version for systems development/experimentation
- 200 Develop PTT Conformance Tester V3 to support Mil-Std-188-220C for system certification testing
- 100 Develop PTT Network Analyzer V3 to support Mil-Std-188-220C CNR network operation & performance
- 250 Develop VMF test tool, Rel 7, to support correct C4IEWS system implementations of Technical Architecture's VMF Reissue 5+
- 200 Develop VMF Reissue 5+ VMF database

Total 3171

B. Other Program Funding Summary: None

C. Acquisition Strategy: The efforts funded in this project are non-system specific, supporting interoperability across multiple systems. The contractual efforts/services are obtained from existing competitive omnibus support services contracts.

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2004	FY 2005
AIN C4I system support (2000 test-days)										
AIN C4I system support (5000 test-days)										
AIN C4I system support (8800 test-days)	1-4Q									
AIN C4I system support (7500 test-days)		1-4Q								
AIN C4I system support (sw/interop/dev/field)			1-4Q							
DIL Testbed support for DAWE, FDD, JCF & BD		1-4Q	1-4Q	1-4Q	1-4Q					
Acquire DIL testbed systems		1-4Q	1-4Q	1-4Q	1-4Q					
VMF Tester, Rel 2										
VMF Tester, Rel 3	2Q									

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D097

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2004	FY 2005
VMF Tester, Rel 4		4Q								
VMF Tester, Rel 5			3Q							
VMF Tester, Rel 6				4Q						
VMF Tester, Rel 7					4Q					
PTT Monitor/Decoder v1	3Q									
PTT Monitor/Decoder v2		4Q								
PTT Monitor/Decoder v2.1			4Q							
PTT Monitor/Decoder v2.2				4Q						
PTT Monitor/Decoder v3					4Q					
PTT Conformance v1		3Q								
PTT Conformance v2			4Q							
PTT Conformance v2.1				4Q						
PTT Conformance v3						4Q				
PTT Net Analyzer prototype		3Q								
PTT Net Analyzer v1			2Q							
PTT Net Analyzer v2				4Q						
PTT Net Analyzer v3					4Q					

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D097

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Labor (internal Govt)		USACECOM FM NJ	908	1040	01/01/99	1020	01/01/00	1020	01/01/01	Cont'd	3988	
b. Travel		USACECOM FM NJ	36	40	01/01/99	25	01/01/00	25	01/01/01	Cont'd	126	
c. Systems Management		USA TARDEC Warren MI	7	TBD							7	
d. Systems Engineering	MIPR	USA AMCOM Huntsville AL	325	TBD							325	
e. Systems Engineering	MIPR	USA TACOM Picatinny, NJ	143	TBD							143	
f. Contract Services												
1)Surge Support Contract	C/CPFF	DCS Corp. Alexandria VA	500	TBD							500	
2)Systems & Software Engineering	C/CPFF	SAIC Corp. San Diego CA	90	TBD							90	
3)Battlefield Automated Sys. Engrg Spt (BASES)	C/CPFF	EER System Corp Lanham MD	60	TBD							60	
Subtotal Product Development:			2069	1080		1045		1045			5239	

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Software Development	C/CPFF	Arinc, Ft Monmouth NJ	95	200	10/93	125	3/99	125	*	Cont'd	545	
b. Software Development	C/CPAF	Telos, Ft Monmouth NJ	188	220	12/95	244	*	244	*	Cont'd	896	
c. Systems Integration	C/CPFF	Arinc, Ft Monmouth NJ	280	250	10/93	100	3/99	100	*	Cont'd	730	
d. Development Support	C/CPFF	Arinc, Ft Monmouth NJ	400	340	10/93	140	3/99	140	*	Cont'd	1020	
e. Development Support	C/CPAF	Telos, Ft Monmouth NJ	21	259	12/95	159	*	159	*	Cont'd	598	
f. Development Support	C/CPFF	CSC, Ft Monmouth NJ	150	280	3/95	280	*	280	4/00	Cont'd	990	
g. Development Support	C/CPFF	C3I, Ft Monmouth NJ	150	200	7/96	300	*	300	*	Cont'd	950	
h. Systems Engineering	C/CPFF	Arinc, Ft Monmouth NJ	200	200	10/93	50	3/99	50	*	Cont'd	500	

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D097

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
i. Testing Support	C/CPFF	Arinc, Ft Monmouth NJ	115	125	10/93	50	3/99	50	*	Cont'd	340	
j. Testing Support	C/CPAF	Telos, Ft Monmouth NJ	490	250	12/95	100	*	100	*	Cont'd	940	
k. Technical Support	C/CPFF	Arinc, Ft Monmouth NJ	360	350	10/93	90	3/99	110	*	Cont'd	910	
l. Technical Support	C/CPFF	Nations, Monmouth NJ	21	20	6/94	20	7/99	21	*	Cont'd	82	
m. Configuration Mgmt	C/CPFF	Arinc, Ft Monmouth NJ	93	90	10/93	25	3/99	25	*	Cont'd	233	
n. Configuration Mgmt	C/CPAF	Telos, Ft Monmouth NJ	0	20	12/95	20	*	20	*	Cont'd	60	
o. Equipment	C/CPFF	Arinc, Ft Monmouth NJ	0	20	10/93	20	3/99	20	*	Cont'd	60	
p. Equipment	Reqn	USACECOM, "	450	320	1/99	300	1/00	300	1/01	Cont'd	1370	
q. Telecommunications	MIPR	USASC Ft Huachuca AZ	40	40	1/99	72	1/00	82	1/01	Cont'd	234	
Subtotal Support Costs:			3053	3184		2095	*	2126	*		10458	

Remark: *Contracts cited are 5 year (1 base year + 4 option years). Future award dates imply future competitive award, contractor TBD.

III. Test and Evaluation: Not applicable

IV. Management Services: Not applicable

Project Total Cost:			5122	4264		3140		3171			15697	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D098

COST (*In Thousands*)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D098 Tactical Radio Accessories	475	466	0	0	0	0	0	0	0	4662

A. Mission Description and Budget Item Justification: Project D098 - Tactical Radio Accessories: This project will provide for PM participation in the development efforts for the Combat Survivor Evader Locator System (CSEL), a joint program led by the Air Force. This program will provide service, joint, and/or composite operational recovery/rescue forces with the capability to pinpoint the location of and establish communication with downed personnel in need of extraction from hostile territories. The CSEL system will include the capability to pass data directly into the standard warfighter command, control, communications, computer, and intelligence (C4I) systems. The user's equipment will consist of a small hand-held unit used for geopositioning, over-the-horizon data communications, and two-way line-of-sight voice communications.

FY 1998 Planned Program:

- 475 Support Air Force Development efforts on CSEL program

Total 475

FY 1999 Planned Program:

- 170 Program Management Support
- 283 Testing Support Analysis
- 13 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs

Total 466

FY 2000 Planned Program: Project not funded in FY 2000

FY 2001 Planned Program: Project not funded in FY 2001

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
ARMY, OPA2 B03200, Combat Survivor Evader Locator (CSEL)	1059	13675	0	0	13294	24092	20098	6868	0	79086

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	PROJECT **D098**

C. Acquisition Strategy: The joint Air Force led acquisition strategy is a research and development approach for the handheld unit, followed by a production contract award in FY 1998. $5M was reprogrammed to DA on 11 August 1998.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Army LRIP Decision				1Q				
CT/DT/OA 2			3Q					
Option 2 Contract Award (LRIP)				1Q				
Option 3 Contract Award					1Q			
Option 1 Deliveries		2Q						
Option 2 Deliveries (LRIP)				3Q				
Milestone Decision III					3Q			

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D485

COST (*In Thousands*)	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D485 C4I Systems Certification	5498	5066	5303	4704	4494	4373	4444	4459	Continuing	Continuing

A. Mission Description and Budget Item Justification: C4I Systems Certification: Evaluate system's interoperability for the Army XXI battlefield digitization effort, in support of the Vice Chief of Staff of the Army (VCSA) and Army Acquisition Executive (AAE), to identify interoperability issues, develop certification recommendations, and provide architecture assessments by the Digital Integration Lab (DIL). Interoperability certification recommendations and assessments are provided to the Army Digitization Office (ADO) and Army System Engineer. Establish and sustain interoperability between Army C4I systems, and between the Army and Joint/Allied C4I communities in support of DOD 4630.5, DODI 4630.8, CJSCI 6212.01, and AR73-1. Provide the Army focal point for the review, staffing, coordination, and development of Army positions for interface interoperability standards and specifications. Participate in Joint/Allied and intra-Army interoperability certification testing and represent the Army in the Joint/Allied Configuration Management Process. Develop and configuration manage two key elements of the Joint/Army Technical Architectures - the Variable Message Format (VMF) message and the MIL-STD-188-220 protocol standards, in support of Army Science Board directive and approved Technical Architectures.

FY 1998 Accomplishments:

- 760 Evaluated and certified IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures
- 610 Provided DIL System Engineering and Integration support for conduct of experiments and evaluations to support FDD, Joint Contingency Force AWE, & Joint Tests.
- 279 Provided systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.
- 240 Evaluated and validated Technical and Systems Architectures, including development of tools for compliance evaluation.
- 624 Developed, evolved and approved Army/Joint VMF TIDP
- 332 Obtained joint approvals for Army's VMF ICPs for FDD and Y2K
- 121 Updated VMF databases per evolving VMF standards
- 556 Developed 'B' versions of Mil-Stds 188-220 & 2045-47001 for TA and evolving Battlefield Digitization and FDD requirements
- 690 Provided engineering evaluations and Army CM of 342 TADIL joint messages
- 455 Provided engineering evaluations and Army CM of 147 USMTF joint messages
- 831 Directed and managed Army's joint certification testing/analysis for system certifications, and represented Army's consolidated positions at Joint Analysis Review Panels

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BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D485

Total 5498

FY 1999 Planned Program:

- 780 Evaluate and certify IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures
- 660 Provide DIL System Engineering and Integration support for conduct of experiments and evaluations to support FDD, Joint Contingency Force AWE, & Joint Tests.
- 335 Provide systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.
- 300 Evaluate and validate Technical and Systems Architectures, including development of tools for compliance evaluation.
- 325 Develop, evolve and approve Army/Joint VMF TIDP
- 332 Obtained joint approvals for Army's VMF ICPs for FDD and Y2K
- 76 Update VMF databases per evolving VMF standards
- 574 Develop 'C' versions of Mil-Stds 188-220 & 2045-47001 for TA and evolving Battlefield Digitization and FDD requirements
- 619 Provide engineering evaluations and Army CM of TADIL joint messages
- 430 Provide engineering evaluations and Army CM of USMTF joint messages
- 518 Direct and manage Army's joint certification testing/analysis for system certifications, and represent Army's consolidated positions at Joint Analysis Review Panels
- 117 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs

Total 5066

FY 2000 Planned Program:

- 625 Evaluate and certify IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures
- 550 Provide DIL System Engineering & Integration support for conduct of experiments & evaluations to support FDD, JCF AWE, & Joint Tests.
- 200 Provide systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.
- 200 Evaluate and validate Technical and Systems Architectures, including development of tools for compliance evaluation.
- 325 Develop, evolve and approve Army/Joint VMF TIDP
- 325 Obtained joint approvals for Army's VMF ICPs for FDD and other battlefield digitization requirements
- 90 Update VMF databases per evolving VMF standards

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D485

- 575 Develop 'C' versions of Mil-Stds 188-220 & 2045-47001 for TA and evolving Battlefield Digitization requirements
- 650 Provide engineering evaluations and Army CM of TADIL joint messages
- 605 Provide engineering evaluations and Army CM of USMTF joint messages
- 808 Direct & manage Army's joint certification testing/analysis for system certifications; represent Army's consolidated positions at JARPs

FY 2000 Planned Program: (continued)

- 100 TDLMP Management
- 250 NATO message development/harmonization support

Total 5303

FY 2001 Planned Program:

- 500 Evaluate and certify IT/C4ISR systems interoperability for FDD, Joint experiments to assure compliance with the Technical and System Architectures
- 450 Provide DIL System Engineering and Integration support for conduct of experiments and evaluations to support FDD, Joint Contingency Force AWE, & Joint Tests.
- 150 Provide systems engineering, integrated support & field support for identification and resolution of systems' discrepancies and inconsistencies identified during evaluations.
- 150 Evaluate and validate Technical and Systems Architectures, including development of tools for compliance evaluation.
- 325 Develop, evolve and approve Army/Joint VMF TIDP
- 325 Obtained joint approvals for Army's VMF ICPs for battlefield digitization requirements
- 90 Update VMF databases per evolving VMF standards
- 600 Develop, obtain joint approval and publish Mil-Stds 188-220C & 2045-47001C for TA and evolving Battlefield Digitization requirements
- 600 Provide engineering evaluations and Army CM of TADIL joint messages
- 600 Provide engineering evaluations and Army CM of USMTF joint messages
- 829 Direct and manage Army's joint certification testing/analysis for system certifications, and represent Army's consolidated positions at Joint Analysis Review Panels (JARPs)
- 85 TDLMP Management

Total 4704

B. Other Program Funding Summary: None

C. Acquisition Strategy: The efforts funded in this project are non-system specific, interoperability experimentation, evaluation and certification across multiple systems.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D485

The contractual efforts/services are obtained from existing competitive omnibus support services contracts.

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2004	FY 2005
Evaluate, certify systems for & support TF/DAWE	1-4Q	1Q								
Evaluate, certify systems for and support FDD		1-4Q	1-4Q	1-4Q						
Evaluate, certify systems for and support Joint Contingency Force AWE		1-4Q	1-4Q	1-4Q						
Evaluate, experiment, and provide systems integration for testing of ACTD, ATD & STO's.		1-4Q	1-4Q	1-4Q	1-4Q					
Complete FDD CMP/DII COE evaluation Capability			3Q		3Q					
Army VMF (TFXXI) TIDP	2Q									
Joint VMF TIDP	4Q	3Q	3Q	3Q	3Q					
Joint VMF ICPs	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q					
Joint VMF Database update	2Q	2Q/4Q	2Q/4Q	2Q/4Q	2Q/4Q					
Joint approval/publication of 188-220A & 47001										
Joint approval/publication of 188-220B & 47001B		2Q								
Joint approval/publication of 188-220C & 47001C					4Q					
TADIL/USMTF ICPs	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q					
Joint Certification Testing support	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q					
Joint WGs/Panels	1-4Q	1-4Q	1-4Q	1-4Q	1-4Q					

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D485

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Labor (internal Govt)		USACECOM FM NJ	1579	1653	01/01/99	1698	01/01/00	1708	01/01/01	Cont'd.	6638	
b. Travel		USACECOM FM NJ	30	40	01/01/99	50	01/01/00	50	01/01/01	Cont'd.	170	
Subtotal Product Development:			1609	1693		1748		1758			6808	

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Development Support	C/CPFF	Arinc, Ft Monmouth NJ	700	600	10/93	600	3/99	600	*	Cont'd	2500	
b. Development Support	C/CPAF	Telos, Ft Monmouth NJ	903	784	12/95	978	*	789	*	Cont'd	3454	
c. Development Support	C/CPFF	CSC, Ft Monmouth NJ	750	560	3/95	316	*	160	*	Cont'd	1786	
d. Development Support	C/CPFF	C3I, Ft Monmouth NJ	450	400	7/96	250	*	206	*	Cont'd	1306	
e. Development Support	SS/CPFF	Mitre, Ft Monmouth NJ	0	280	10/98	150	10/99	100	10/00	Cont'd	530	
f. Testing Support	C/CPFF	Arinc, Ft Monmouth NJ	250	366	10/93	760	3/99	620	*	Cont'd	1996	
g. Technical Support	C/CPFF	Arinc, Ft Monmouth NJ	200	47	10/93	50	3/99	50	*	Cont'd	347	
h. Technical Support	C/CPFF	Tracor, Ft Monmouth NJ	36	36	12/95	36	*	36	*	Cont'd	144	
i. Configuration Mgmt	C/CPAF	Telos, Ft Monmouth NJ	150	165	12/95	255	*	225	*	Cont'd	795	
j. Equipment	Reqn	USACECOM, "	50	35	1/99	60	1/00	60	1/01	Cont'd	205	
k. Telecommunications	MIPR	USASC Ft Huachuca AZ	400	100	1/99	100	1/00	100	1/01	Cont'd	700	
Subtotal Support Costs:			3889	3373		3555		2946			13763	

Remark: *Contracts/awards cited are 5 year (1 base year + 4 option years). Future award dates imply future competitive award, contractor TBD.

III. Test and Evaluation: Not applicable

IV. Management Services: Not applicable

Project Total Cost:			5498	5066		5303		4704			20571	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY **5 - Engineering and Manufacturing Development**	PE NUMBER AND TITLE **0604805A Command, Control, Communcations Systems - Engineering Development**
	PROJECT **D589**

COST *(In Thousands)*	FY1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY2004 Estimate	FY2005 Estimate	Cost to Complete	Total Cost
D589 Army Systems Engineering & Warfighter Technical Support	3257	6484	7755	7897	8172	8133	8148	8183	Continuing	Continuing

A. <u>Mission Description and Budget Item Justification</u>: Army Systems Engineering & Warfighter Technical Support: Recommended by the Army Science Board and directed by the Army Acquisition Executive (AAE) and Vice Chief of Staff of the Army (VCSA), the ASE Provides essential technology expertise on all Systems Engineering and Technical Architecture (SE/TA) matters critical to gain Information Dominance and foster interoperability among all Army systems. The Joint Technical Architecture-Army (JTA-A) provides the 'building code" foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. Army System Engineer (ASE) supports CIO/DISC4/ADO in defining and maintaining the JTA-A and technically influences development and implementation of the JTA. ASE identifies new and emerging standards for integration of new technologies into existing Army Systems and ATD/ACTDs to support Army 2010. The ASE's work efforts associated with the development and implementation of the JTA-A under this project are critical path elements to achieve the Army's DIV XXI, CORPS XXI, and Army XXI digitization mission, provide the ability to fight and win on tomorrow's battlefield, and assure compatibility with both Joint and Coalition Warfighters. WTS provides essential field technical expertise, on-site architectural/system analysis and execution planning to integrate emerging technologies and support the next generation of digitization across all 21st Century Battlefield Operating Systems. Promotes joint experiments in conjunction with Joint C4ISR Battle Center (JBC). Conducts interservice coordination to identify candidate systems, provides expert analysis to define appropriate architecture, and evaluates notional designs and conducts performance/cost benefit analysis to recommend viable tradeoffs. Selects target architecture and works with warfighter to engineer appropriate field experiments (Battlelab Warfighter Experiments (BLWE), Army Warfighter Experiments (AWE) and warfighter rotations) to allow selection of appropriate systems and sub-systems for follow-on development and acquisition. Performs technical coordination/integration activities to accelerate system enhancements providing solutions to current user problems in the field capturing soldier ingenuity through on-the-spot soldier input/feedback. Supports development of the operational architecture and implementation of new warfighter information technologies throughout the force structure to achieve Army Enterprise Architecture (AEA) objectives.

FY 1998 Accomplishments:

- 1000 Conducted major Joint Technical Architecture-Army (JTA-A) compliant system design evaluations for CRUSADER, Near Term Digital Radio, M1A2 ABRAMS Fire Support, Land Warrior, WIN-T.
- 500 Assessed JTA-A Interoperability for Army Systems (Universal Modem, MIDOCS, STAMIS Computer Contract II, Mortar Fire Control System, COMBAT ID Dismounted Soldiers.
- 700 Provided quick response compliance assessment evaluations of ATA compliance for of Grenadier Brat, Movement Tracking System (MTS), Army Act II Programs, All Army WRAP Candidates.
- 313 Developed JTA-A Version 5.0 and JTA Version 2.0 (Army input).

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D589

- 544 Introduced Army air support to Joint Battle Center (JBC) GCCS Ground Tracks (Grenadier BRAT) experiment. Planned Joint Intelligence Surveillance and Reconnaissance (JISR), LINK16, Joint Contingency Force (JCF) joint experiments.

FY 1998 Accomplishments: (continued)

- 200 Enhanced Interim Design Division (IDD) Situational Awareness capability with In-Theater Injection and on-site engineering support to DIVXXI.

Total 3257

FY 1999 Planned Program:

- 1269 Conduct Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability. (Future Scout Calvary System, Tactical UAV,WIN-T, Army Battle Command System Version 5.0)
- 1280 Ensure JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&T Programs (1st. Lt. Division Force Sys. Architecture, 1st. Digitized Corps system Architecture)
- 800 Assess JTA-A interop for Army Systems, (I3A, AMC-ISA)
- 617 Technically influence the development/implementation of Joint Technical Architecture (JTA)
- 432 Maintain existing JTA-A Information Technical Standards
- 450 Investigate information technical standards for inclusion in JTA-A/JTA
- 169 Technically influence commercial and international standards forums
- 550 Identify joint experiments, and provide inter-service coordination and experimental design support to JBC. Support JCF Army Warfighting Experiment (AWE) with joint coordination, early planning and implementation of JCF initiatives. Engineer JISR and LINK16 joint experiments. Conduct Army portion of All Service COMBAT ID Evaluation and Test (ASCIET).
- 497 Plan and integrate C4IEWS concepts for wargames for Army After Next (AAN)exercises. Align tech base programs with emerging Army user requirements for 2025 Hybrid Force. Develop Strike Force C4IEWS architecture concepts
- 310 Force XXI support to plan and integrate Reconnaissance TOC for 1st Digitized Division for Force XXI, engineer Global Combat Service Support (GCSS) logistics platform integration, provide field engineering support to user experiments and engineer product improvement/technical insertion into post Division AWE systems.
- 110 Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) Programs

Total 6484

FY 2000 Planned Program:

- 1335 Conduct Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability.
- 1342 Ensure JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&T Programs.
- 800 Assess JTA-A interop for Army Systems.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D589

- 808 Technically influence the development/implementation of Joint Technical Architecture (JTA).
- 623 Maintain existing JTA-A Information Technical Standards.
- 640 Investigate information technical standards for inclusion in JTA-A/JTA.

FY 2000 Planned Program: (continued)

- 469 Technically influence commercial and international standards forums.
- 616 Engineer joint Strike Force C4IEWS research & development experiment. Conduct limited objective Strike Force experiment and information operations experiment in conjunction with JBC.
- 730 Introduce early C4IEWS AAN concepts into existing programs. Plan and integrate comprehensive/extended Strike Force experiment. Conduct requirements oriented review of next generation tech base programs.
- 392 Integrate digitization technology down to soldier. Develop distributed/network centric concepts for integration into digitized force. Engineer product improvement/technical insertion to Light Force systems.

Total 7755

FY 2001 Planned Program:

- 1350 Conduct Major design evaluations for Joint Technical Architecture-Army (JTA-A) Interoperability.
- 1355 Ensure JTA-A Interop Implementation and Assess JTA-A compatibility for Army and S&T Programs.
- 800 Assess JTA-A interop for Army Systems.
- 808 Technically influence the development/implementation of Joint Technical Architecture (JTA).
- 623 Maintain existing JTA-A Information Technical Standards.
- 640 Investigate information technical standards for inclusion in JTA-A/JTA.
- 469 Technically influence commercial and international standards forums.
- 650 Conduct joint Strike Force C4IEWS comprehensive experiment. Extend digitization experiment to coalition forces. Develop conceptual joint/coalition experiment of digitization across all force levels – Light, Strike and Heavy.
- 702 Plan and integrate early AAN with total force digitized/network centric concept. Plan for next generation digitization systems. Incorporate airborne relay for range extension system architecture.
- 500 Implement distributive/network centric concepts to Force XXI. Engineer product improvement/technical insertion to Strike Force Systems.

Total 7897

B. Other Program Funding Summary: None

C. Acquisition Strategy: The efforts funded in the project are non-system specific, therefore no acquisition strategy is provided.

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D589

D. Schedule Profile	FY 1997	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2004	FY 2005
TA – JTA-A 6.0			3Q							
TA – JTA 3.0			3Q							
TA – JTA-A 7.0				3Q						
TA – JTA 4.0				3Q						
TA – JTA-A 8.0					3Q					
TA – JTA 5.0					3Q					
SA – 1DFSA Updates			1Q	1Q	1Q					
SA – 1LDFSA			2Q							
SA – AMC-ISA			4Q	3Q	3Q					
SA – I3A			3Q							
SA – 1DCSA Updates				2Q	2Q					
SA – I3A Updates				3Q	3Q					
STRIKE Force SA			3Q							
ASCIET Joint Experiment			2Q							
JCF AWE R&D Architecture			2Q							
AAN Planning Conference 1			1Q							
JCF AWE Initiative Implementation				2Q						
JCF AWE Support				2Q						
AAN Planning Conference 2				1Q						
STRIKE Force Initiatives				1Q						
JCF AWE After Action					3Q					
STRIKE Force AWE					3Q					
AAN Planning Conference 3					1Q					

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D589

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
Government Systems Engineering Support		ASEO, Ft Monmouth, NJ	1417	1678		1800		1800		Con't	6695	
Engineering Support		ISEC, Ft Huachuca, AZ	0	592		700		700		Con't	1992	
Contract Systems Engineering Support	C & FPI	CSC, Eatontown, NJ	823	1260	1 Oct 98	1483	1 Oct 99	1511	1 Oct 00	0	5077	
	SS & FP	MITRE, Tinton Falls, NJ	101	1114	1 Oct 98	1370	1 Oct 99	1370	1 Oct 00	0	3955	
	C & FP	Battelle, Alexandria, VA	0	100	30 Nov 98	200	30 Nov 99	200	30 Nov 00	0	500	
	C & FP	SRC, Atlanta GA.	70	100	30 Nov 98	100	30 Nov 99	100	30 Nov 00	0	370	
Systems Engineering and Integration		WTS – ISIO CECOM, Ft Monmouth, NJ	300	651		866		920		Con't	2737	
	C & T&M-WR	C3ISGI, Tinton Falls, NJ(Sole Source in 98)	197	509	9 Sep 98 (3 yrs)	700	9 Sep 98 (3 yrs)	780	9 Sep 98 (3 yrs)	0	2186	
Travel		ASEO/ISIO CECOM, Ft Monmouth, NJ	199	290		330		310		Con't	1129	
Overhead		ASEO/ISIO CECOM, Ft Monmouth, NJ	150	190		206		206		Con't	752	
Subtotal Product Development:			3257	6484		7755		7897			25393	

II. Support Costs: Not applicable

III. Test and Evaluation: Not applicable

IV. Management Services: Not applicable

Project Total Cost:			3257	6484		7755		7897			25393	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D591

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D591 Weapons System Technical Architecture	0	0	1063	1058	1054	1051	0	0	Continuing	Continuing

A. Mission Description and Budget Item Justification: Weapons System Technical Architecture: The Joint Technical Architecture-Army (JTA-A) provides the 'building code" foundation for designing, building, fielding, and supporting interoperable systems in an expedient and cost-effective manner. The Weapons System Technical Architecture (WSTA) identifies new and emerging standards for integration of new technologies into existing Army Weapon Systems in support of Army digitization efforts. WSTA will define weapon system domain exceptions and extensions to the JTA and JTA-Army. It will promote an open systems approach in Army weapon systems in response to OSD open system initiatives. It will work to expand the Defense Information Infrastructure Common Operation Environment concept to properly accommodate Army weapon systems. NOTE: This is not a new start effort, FY 1998 and FY 1999 program tasks have been resourced through an joint HQDA/HQAMC effort via a series of below-threshold reprogramming actions across multiple program elements and project lines.

FY 1998 Accomplishments: Project not funded in FY 1998

FY 1999 Planned Program: Project not funded in FY 1999

FY 2000 Planned Program:

- 1063 OE Implementation and Defense Information Infrastructure Common Operating Environment Integration
- Continue Embedded Commercial Standards analysis/development for Weapons system architecture
- Pursue rigorous Domain Analysis/Framework Definition
- Complete work on Embedded Battle Command Analysis
- Update Appendix F (WSTA Appendix) to JTA-A

Total 1063

FY 2001 Planned Program:

- 1058 Complete Defense Information Infrastructure/Common Operating Environment real-time software re-use products for Army Weapon systems
- Develop and codify universal device driver interface
- Define and codify architecture description language
- Update Appendix F (WSTA Appendix) to JTA-A

Total 1058

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D591

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
TBD										

C. Acquisition Strategy: Not applicable

D. Schedule Profile: Not applicable

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D591

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Product Development	TBD	TBD				1063	TBD	1058	TBD		2121	
Subtotal Product Development:						1063		1058			2121	

II. Support Costs: Not applicable

III. Test and Evaluation: Not applicable

IV. Management Services: Not applicable

Project Total Cost:						1063		1058			2121	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY 5 - Engineering and Manufacturing Development	PE NUMBER AND TITLE 0604805A Command, Control, Communcations Systems - Engineering Development PROJECT D615

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D615 JTRS Ground Domain	0	0	4904	5183	3581	6001	12281	9810	0	41760

A. Mission Description and Budget Item Justification: The NTDRS program is a Research and Development Program that maximizes the use of Non-Development Item (NDI) and Commercial Off-The-Shelf (COTS) hardware and software. The program provides an interim solution to the long term Army need for greatly enhanced data capacities at Tactical Operations Centers. NTDRS will provide the Army's Tactical Internet Tactical Operation Center (TOC) to Tactical Operation Center (TOC) data distribution from Battalion to Brigade and for critical moving platforms from Brigade to Division in the First Digitized Division and may serve as the proof of concept leading to the integration of the NTDRS waveform/network into the Joint Tactical Radio System (JTRS) Program. FY 2000 funding is the final year of the RDTE dollars in support of the NTDRS. Funding for the NTDRS in FY 1999 and prior resides in PE0603713A, D370. The JTRS Software Architecture Development effort is the responsibility of the JTRS Joint Program Office and is funded under PE0604280A. Beginning in FY 2001, Project D615 supports the Army Unique Program for the JTRS. The JTRS is a joint Research and Development program that will lead to the Services acquiring a family of affordable, scaleable, high-capacity, interoperable Line of Sight (LOS) and Beyond Line of Sight (BLOS) tactical radios. JTRS activity in this program element supports the Army hardware development. The Army must develop hardware that is built to JTRS architecture standards, supports an open standards architecture, and a set of software-based, legacy tactical waveforms. Together, the architecture, the hardware, and the software will yield software programmable and hardware configurable digital radio systems that provide increased interoperability, flexibility and adaptability. The open standards based architecture will also provide the path for future hardware and software growth of delivered systems at minimal cost by allowing the Services to take advantage of advances in technology being realized in the commercial wireless communications marketplace. The JTRS will provide operational forces with an upgraded communications capability, for more effective battlespace management and interoperability among Command, Control, Communications, Computers and Intelligence (C4I) Systems supporting the warfighters' goal of realizing a fully digitized battlespace.

FY 1998 Accomplishments: Project not funded in FY 1998

FY 1999 Planned Program: Project not funded in FY 1999

FY 2000 Planned Program:

•	798	NTDRS Program Management Activities
•	2322	Completion of NTDRS Testing
•	1250	Completion of NTDRS Engineering Development (T&M Effort)
•	534	NTDRS System Integration
Total	4904	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)	DATE February 1999
BUDGET ACTIVITY **5 - Engineering and Manufacturing Development**	PE NUMBER AND TITLE **0604805A Command, Control, Communcations Systems - Engineering Development**
	PROJECT **D615**

FY 2001 Planned Program:

- 1709 JTRS PMO Support
- 1875 Army Integration - JTRS
- 1599 Wide Band Studies/Army Unique Development - JTRS

Total 5183

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
OPA, Army, ADDS, BU1400	64910	46919	38763	38310	32226	34215	60122	120672	Cont	Cont

C. Acquisition Strategy: The NTDRS program maximizes the use of Non-Developmental Item (NDI) and Commercial Off-the-Shelf (COTS) hardware and software. An RDTE contract was awarded competitively in January 1996. The NTDRS was successfully tested in the Division XXI AWE in November 1997, Electronic Proving Ground (EPG) Field Test I in February 1998,and the FBCB2 LUT in August 1998. In FY 1999 and FY2000 the NTDRS will participate in the FBCB2 FDTE/IOT&E and other exercises to provide the Army's Tactical Internet TOC-TOC data communications. In FY 1999 and FY2000 NTDRS will continue design and testing efforts. Planned deployment of the NTDRS into the FDD for continued experimentation purposes is scheduled for mid-FY 2000. Beginning in FY2001 project D615 will support JTRS Army Unique hardware development. The JTRS will support an evolutionary acquisition strategy. The JTRS Joint Program Office (JPO) is responsible for common core activities including developing, maintaining, and evolving the JTRS open standards architecture, providing re-coded versions of legacy waveforms to operate on JTRS architecture compliant hardware, and providing a certification infrastructure for hardware/software compliance. Following the architecture's validation and a market survey of industry's capabilities, a program review will occur. Following that review, the Services, which retained acquisition and weapon system integration responsibility, will begin acquiring scaleable JTRS systems commensurate with Service migration plans. The Army portion of the system integration effort will be performed within this Project. Through industry teaming, the JTRS program and architecture will capitalize on previous government sponsored software definable radio activity such as NTDRS, EPLRS, SPEAKeasy, JCIT, TCDL, GLOMO, ULTRACOM, and WRN as well as similar efforts occurring in the commercial wireless information transfer sector. The development of this open standards architecture will foster and facilitate increased competition at all levels for initial acquisitions as well as for future hardware and software upgrades. Further procurement actions will be made by the services to acquire this "proven certified" technology in production configurations to replace the legacy radios in the DoD inventory today.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
NTDR Participation in FBCB2 IOT&E			1Q					
Complete NTDRS FDD Deployment			4Q					
Architecture Provided by JPO			4Q					

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D615

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS T&M Efforts (Projected)	C/T&M	ITT Ft. Wayne	*			1250	TBD				1250	
b. JTRS Army Integration	MIPR	TBD						1875	TBD		1875	
c. JTRS Wideband Studies/Army Unique Development	TBD	TBD						1599	TBD		1599	
Subtotal Product Development:						1250		3474			4724	

Remark: *NTDRS - prior to FY 2000 were charged against 0603713A, D370.

II. Support Costs	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS Frequency/Logistics	MISC	MISC	*			175	Jan 00				175	
b. Installation/Training FDD	MISC	MISC	*			125	TBD				125	
c. NTDR System Integration	MIPR	TBD	*			234	TBD				234	
Subtotal Support Costs:						534					534	

Remark: *NTDRS - prior to FY 2000 were charged against 060713A, D370.

III. Test and Evaluation	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS Field Testing	MIPR	EPG, Ft. Huachuca	*			2322	TBD				2322	
Subtotal Test and Evaluation:						2322					2322	

Remark: *NTDRS - prior to FY 2000 were charged against 0603713A, D370.

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D615

IV. Management Services	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. NTDRS Program Support	MIPR	Ft. Monmouth, NJ	*			798	TBD				798	
b. JTRS PMO Support	MIPR	TBD						1709	2Q		1709	
Subtotal Management Services:						798		1709			2507	

Remark: *NTDRS - prior to FY 2000 were charged against 0603713A, D370.

Project Total Cost:						4904		5183			10087	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D629

COST (*In Thousands*)	FY 1998 Actual	FY 1999 Estimate	FY 2000 Estimate	FY 2001 Estimate	FY 2002 Estimate	FY 2003 Estimate	FY 2004 Estimate	FY 2005 Estimate	Cost to Complete	Total Cost
D629 Tactical Communications System-Advanced Development	0	0	1822	1829	1845	1859	0	0	0	0

A. Mission Description and Budget Item Justification This project will validate the new Tactical Internet capability required for Force XXI. It provides definition, integration and testing of a mix of mature and prototype products which are used to develop a Tactical Internet capability. The Tactical Internet will be the primary data communications infrastructure at Corps and below for Force XXI and will revolve around interconnecting a mix of existing (e.g.: SINCGARS, SINCGARS SIP, EPLRS, MSE TPN, ETC) and emerging communications devices using gateways and routers. Gateways will also provide the link to Strategic levels. This capability will result in the tactical equivalent of the Information Highway and will support key battlefield functional areas to include logistics reporting, telemedicine, etc. The Tactical Internet (TI) will use and leverage commercial network standards and products. The "Internet Protocol" (IP) suite will be used to provide seamless communications with the capability to dynamically route data to hosts. It will be designed to facilitate technology insertion. The focus of this project will be to reduce the technical risk by assembling, integrating, and testing the Tactical Internet components prior to TF XXI, Division XXI, and Corps XXI and beyond. New services and components will be added and tested as required for each iteration leading up to Force XXI. Note: This program is not a new start effort, this project has been funded under PE/Proj. 0603805A/D246, and has been moved to this PE at the request of the OSD comptroller.

FY 1998 Accomplishments: Project not funded in FY 1998

FY 1999 Planned Program: Project not funded in FY1999

FY 2000 Planned Program:

•	1465	Integrate latest R&D products into the Tactical Internet (TI). Demonstrate improvements for TI architecture
•	357	Demonstrate the capabilities of the Surrogate Joint Tactical Radio System (JTRS) on an airborne platform
Total	1822	

FY 2001 Planned Program:

•	1461	Integrate advanced mobile network technologies into the Tactical Internet (TI). Demonstrate improvements in TI communications services for low echelon subscribers.
•	368	Demonstrate the Surrogate Joint Tactical Radio System (JTRS) interoperability and transmission capabilities on an airborne platform.
Total	1829	

ARMY RDT&E BUDGET ITEM JUSTIFICATION (R-2A Exhibit)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D629

B. Other Program Funding Summary	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005	To Compl	Total Cost
PE 0603805A/ Project D246	1590	1781								

C. Acquisition Strategy: The objective of this program is to validate new TI Capabilities required for Force XXI. In FY97, laboratory integration testing was conducted to reduce risk for Task Force XXI AWE. Similar laboratory was performed in FY98 for Division XXI and for the FBCB2 Limited User Test (LUT). In FY99 new services and components will be added and tested to validate critical technologies for Force XXI beyond FDD.

D. Schedule Profile	FY 1998	FY 1999	FY 2000	FY 2001	FY 2002	FY 2003	FY 2004	FY 2005
Tactical Internet								
Prototype Internet								
System Integration			4Q					
Demonstrate Range Extension			4Q					
Address Architecture Issues			4Q					
Integrate Network Services			4Q	4Q				
Laboratory Testing			4Q	4Q				
Airborne Communications								
Systems Integration			4Q	4Q				
Video Demonstration			4Q	4Q				

ARMY RDT&E COST ANALYSIS (R-3)

DATE: February 1999

BUDGET ACTIVITY: 5 - Engineering and Manufacturing Development

PE NUMBER AND TITLE: 0604805A Command, Control, Communcations Systems - Engineering Development

PROJECT: D629

I. Product Development	Contract Method & Type	Performing Activity & Location	Total PYs Cost	FY 1999 Cost	FY 1999 Award Date	FY 2000 Cost	FY 2000 Award Date	FY 2001 Cost	FY 2001 Award Date	Cost To Complete	Total Cost	Target Value of Contract
a. Systems Engineering	PO	CECOM RDEC, Ft. Monmouth, NJ				1417	01/01/00	1404	01/01/01	Cont'd	2821	
b. Contract Services												
1)	C-T&M AF	CSC/BAH				90	05/03/00	90	05/03/01	360	540	
2)	C-T&M Rqmts	C3I				135	08/28/98	135	08/28/98	540	810	
3)	C-T&M IDIQ	TAMSCO				130	05/19/98	150	05/19/98	600	880	
4)	C-T&M PSLA	LSI				50	07/01/00	50	07/01/01	200	300	
Subtotal Product Development:						1822		1829		1700	5351	

Remark: ***NOTES:***

Performing Activity & Location

CSC/BAH- Computer Science Corporation, support contractor Booz, Allen & Hamilton – Eatontown, NJ
C3I – C3I Systems Group Inc, Award date 8/28/98 with 3 option years- Tinton Falls, NJ
TAMSCO – TAMSCO Inc, Award date 5/19/98 with 5 options years- Calverton, MD
LSI – Lear Sigler Inc, Lakehurst, NJ

Contract Method and Type

C-T&M – Competitive, Time and Materials
-AF- Award Fee
-Rqmts-Requirements
-IDIQ-Indefinite Delivery Indefinite Quantity
-PSLA- Purchase Service Labor Agreement

II. Support Costs: Not applicable

III. Test and Evaluation: Not applicable

V. Management Services: Not applicable

	DATE
	February 1999

BUDGET ACTIVITY	PE NUMBER AND TITLE
5 - Engineering and Manufacturing Development	**0604805A Command, Control, Communcations Systems - Engineering Development**

Project Total Cost:						1822		1829		1700	5351	